

New species and new synonyms of *Conaspidia* Konow (Hymenoptera: Tenthredinidae) with keys to species of the *Conaspidia bicuspis* group and Japanese species

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Abstract: *Conaspidia qinlingia* Wei sp. nov. and *C. wangi* Wei sp. nov. are described from China. Characters of *Conaspidia bicuspis* group are briefly discussed and a key to the species of the group is provided. *Conaspidia murotai* Togashi, 1984 and *Conaspidia ishikawai* Togashi, 2005 are new synonyms of *Conaspidia guttata* (Matsumura, 1912), the latter is briefly redescribed and illustrated. A key to Japanese species of *Conaspidia* is also provided.

Key words: Tenthredininae; sawflies; taxonomy; key

异颚叶蜂属新种及新异名暨 *Conaspidia bicuspis* 种团和日本种类检索表 (膜翅目: 叶蜂科)

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摘要: 报道膜翅目叶蜂科异颚叶蜂属 2 个新种: 秦岭异颚叶蜂 *Conaspidia qinlingia* Wei sp. nov. 和王氏异颚叶蜂 *C. wangi* Wei sp. nov.。简要讨论了 *C. bicuspis* 种团的特征, 编制了该种团分种检索表。简要描述了日本和东西伯利亚分布的三带异颚叶蜂 *Conaspidia guttata* (Matsumura, 1912), 建立 2 个新异名: *Conaspidia murotai* Togashi, 1984, syn. nov. 和 *Conaspidia ishikawai* Togashi, 2005, syn. nov.。还编制了日本异颚叶蜂属分种检索表。

关键词: 叶蜂亚科; 叶蜂; 分类; 检索表

Introduction

Conaspidia Konow, 1898 is a member of Sioblini, Tenthredininae (Takeuchi 1952; Wei & Nie 1998), but the systematic position needs further study (Hara & Togashi 1998). This genus is endemic to the eastern Asia. Most species of this genus are rarely collected though a few species are recorded as pests of some species of *Kalopanax* of Araliaceae (Xiao *et al.* 1983; Hara & Togashi 1998).

Wei & Nie (1997) revised the genus in China and recognized five species groups and keyed 19 world species. After then, six additional species and a new synonym of the genus have been reported. Haris & Roller (1999) described 2 species of the genus from Yunnan, China. Wei (2000) examined some types of Asian sawfly species described by Forsius (1931)

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and reported that *Conaspidia dubiosa* Forsius, 1931 was a junior synonym of *Indotaxonus tricoloricornis* (Konow, 1898). Smith and Saini (2003) reviewed the four Indian species of the genus (*C. dubiosa* Forsius and *C. fasciatipennis* Turner without specimen examined) and described *C. maculosa* Smith & Saini, 2003. Shinohara (2003) reported two additional species of the genus from Vietnam: *C. satoi* Shinohara, 2003 and *C. onoi* Shinohara, 2003. Togashi (2005) described *C. ishikawai* Togashi, 2005 from Japan and keyed five Japanese species of the genus.

A manuscript on a revision of the world species of *Conaspidia* is in preparation. As a book on Japanese sawflies and a book on the insect fauna of the Qinling Mountain will be published this year, the result of the research on some species of the Japanese *Conaspidia* and the descriptions of two new species of the genus from China are published here.

Material and methods

Specimens examined in this study are deposited in the Central South University of Forestry and Technology, Changsha, China (CSCS), unless otherwise stated. Abbreviations for the other depositories are: NSMT — National Museum of Nature and Science, Tsukuba, Japan; USNM — National Museum of Natural History, Smithsonian Institution, Washington, D.C, USA; OPU — Osaka Prefecture University, Osaka, Japan; BMNH — the Natural History Museum, London, UK; KUK — Kobe University, Kobe, Japan; ELKU — Kyushu University, Fukuoka, Japan; SDEI — Senckenberg Deutsches Entomologisches Institut, Muncheberg, Germany; SEHU — Hokkaido University, Sapporo, Japan; SMNH — Swedish Museum of Natural History, Stockholm, Sweden; YNU — Yeungnam University, Gyeongsan, South Korea.

All nomenclatural acts, authors and literature are registered in ZooBank as per the recent proposed amendment to the International Code of Zoological Nomenclature for a universal register for animal names (ICZN 2008).

Abbreviations used are: OOL — distance between the eye and outer edge of lateral ocellus; POL — distance between the mesal edges of the lateral ocelli; OCL — distance between a lateral ocellus and the occipital carina or hind margin of the head; and CD — the ratio of the distance between the two cenchri to the breadth of a cenchrus.

Images of adults were taken with a Nikon D2X digital camera with a series of images montaged using Helicon Focus (©HeliconSoft). Images of the lancet and serrulae were taken with a Motic BA400. Images showing other details were compiled from several partially focused images which were taken with a LEICA S8APO stereo-microscope by combining the focused areas using Helicon Focus (©HeliconSoft).

Taxonomy

Conaspidia bicuspis group

Wei & Nie (1997) proposed *Conaspidia bicuspis* group for four species: *C. bicuspis* Malaise, 1945, *C. fasciatipennis* Turner, 1919, *C. tibetana* Wei, 1997 and *C. latifasciata* Wei, 1997 and followings were regarded as the shared characters for the species group (the

character not valid now is placed within brackets): the forewing with a strongly infusate cross band over the black stigma and a smoky macula at apex but with the basal macula absent; [the basal tooth of left mandible small and obtuse]; the mesoscutellum strongly elevated; cenchri small or vestigial; lance without annular spine and the pilose bands in lancet narrow and isolated. However, in *C. bicuspis* and *C. qinlingia* sp. nov. the basal tooth of the left mandible is sharp, elongated and deeply separated from the middle tooth. The basal tooth of left mandible in other species of the group is really obtuse and shallowly separated from the middle one.

Besides the above four species, *C. onoi* Shinohara, 2003 and the two new species described in this paper are also members of *C. bicuspis* group. These seven species of the *Conaspidia bicuspis* group can be easily separated into three distinct subgroups: *C. bicuspis* subgroup, *C. latifasciata* subgroup and *C. tibetana* subgroup. These subgroups and known species of *C. bicuspis* can be separated by using the following key.

Key to species of *Conaspidia bicuspis* group

1. Basal tooth of left mandible short, not elongated, middle incision between basal two teeth very shallow with acute bottom, both sides of incision strongly divergent toward apex (Fig. 7)2
- Basal tooth of left mandible quite long and acute, middle incision between basal two teeth very deep, both sides of incision parallel (Figs. 15, 17 in Wei & Nie 1997). (Clypeus deeply and broadly emarginated with middle part of clypeus about $0.35-0.25 \times$ length of lateral lobe (Fig. 4); mesoscutellum with distinct peak; female serrulae narrowly and roundly protruding or triangularly protruding; pterostigma black at basal part and yellow at apical part; vein cu-a meeting cell 1M at about middle; inner tooth of claw shorter than apical tooth). *C. bicuspis* subgroup3
2. Clypeus deeply incised to a depth more than half length of clypeus; cenchrus median size, $CD = 3-4$; forewing with vein cu-a meeting cell 1M at middle; head and mesonotum entirely yellow brown without any black; abdominal tergites yellow brown, only tergite 5 with a transversal black stripe; malar space shorter than radius of lateral ocellus in female or linear in male; punctures on upper half of mesepisternum large and usually with smooth and flat interspaces; apical macula on forewing distinct. *C. latifasciata* subgroup4
- Clypeus shallowly incised to a depth less than half length of clypeus; cenchrus quite small, $CD = 7-15$; forewing with vein cu-a meeting cell 1M at basal 0.35; at least ocellar triangle and mesoscutal middle lobe with black or dark brown spot; at least tergites 5–6 with transversal black stripes; malar space as long as diameter of lateral ocellus in female or about as long as radius of lateral ocellus in male; punctures on upper half of mesepisternum small and dense, usually without distinct smooth and flat interspaces; apical macula on forewing very weak. *C. tibetana* subgroup5
3. Posterior margin of abdominal tergites 2–10 entirely black (Fig. 1); black stripe under pterostigma in forewing broadly separated at middle; top of mesoscutellum with one peak; distance between basal two teeth of left mandible very narrow, about 0.2 times middle breadth of basal tooth (Fig. 15); hind femur entirely yellow brown; middle serrulae triangularly protruding, broad and low, with about 10 distal subbasal teeth (Fig. 26). China (Shaanxi) *C. qinlingia* Wei sp. nov.
- Abdominal tergites 6–8 with lateral black stripes; black stripe under pterostigma in forewing not separated at middle; top of mesoscutellum with two peaks; distance between basal two teeth of left mandible broad, about 0.8 times middle breadth of basal tooth; hind femur yellow brown with a distinct black ring at apex; middle serrulae narrowly and strongly protruding, with 3 distal subbasal teeth. China (Anhui, Hubei, Hunan, Guangdong) *C. bicuspis* Malaise
4. Occipital carina sharp and complete; lower 0.35 of mesepisternum and apex of hind tibia black; eyes large, distance between eyes shorter than longest axis of an eye; punctures on upper half of mesepisternum very

- large and close, interspaces linear; lateral side of mesoscutellum densely punctured; head distinctly narrowed behind eyes in dorsal view. China (Guizhou) *C. latifasciata* Wei
- . Occipital carina absent in lower 0.35 of hind orbit and weakly developed in upper 0.65; mesepisternum and hind tibia entirely yellow brown; distance between eyes longer than longest axis of an eye; punctures on upper half of mesepisternum medium-sized, quite sparse, interspaces broad and flat; lateral side of mesoscutellum weakly punctured; head distinctly dilated behind eyes in dorsal view. China (Zhejiang)
..... *C. wangi* Wei sp. nov.
5. Claw with inner tooth clearly longer than apical tooth; mesoscutal lateral lobe with large black spot6
- . Claw with inner tooth clearly shorter than apical tooth; mesoscutal lateral lobe without black spot. Vietnam ..
..... *C. onoi* Shinohara
6. Mesoscutal middle lobe with a large black spot; temple and postocellar area with black stripes; abdominal tergites 4–8 largely black; punctures on upper half of mesepisternum large and sparse, interspaces between punctures flat and broad; length of posterior slope of mesoscutellum about as long as median length of mesoscutal appendage; cenchrus small, CD = 10. China (Guangxi, Yunnan); North India
..... *C. fasciatipennis* Turner
- . Mesoscutal middle lobe, temple and postocellar area without black spot; abdominal tergites 6–7 largely black, other tergites entirely yellow brown; punctures on upper half of mesepisternum small and dense, interspaces between punctures linear; length of posterior slope of mesoscutellum about twice as long as median length of mesoscutal appendage; cenchrus minute, CD = 15. China (Tibet) *C. tibetana* Wei

1. *Conaspidia wangi* Wei sp. nov. (Figs. 1, 3–12)

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Female. Body length 12 mm (excluding antenna and sheath, Fig. 1). Body yellow brown, two broad stripes on abdominal tergite 5 (narrowly separated at middle of tergite) and apical sheath black, tip of mandibles dark reddish, antennal flagellum yellowish white, ventral side of thorax except for upper half of mesepisternum pale yellow brown; legs pale yellow brown; body hairs yellow brown, setae on sheath and spines on wing membrane brown. Wings hyaline, distinctly yellow toward base, with a distinct but small roundish apical spot and a broad infusate stripe below pterostigma, posterior half of vein Sc+R, veins Rs, M and Cu largely dark brown to blackish brown, pterostigma black brown entirely.

Labrum with some shallow and indistinct punctures; clypeus with dense and shallow punctures; supraclypeal area, middle of inner orbit and frontal area with dense but shallow punctures, interspaces feebly coriaceous, shiny; postocellar area with some small and scattered punctures; temple and postorbit smooth, strongly shiny, with minute and scattered punctures. Pronotum smooth, broad posterior margin densely but shallowly punctured; mesoscutal middle lobe and lateral lobes with small and sparse punctures; mesoscutellum smooth, lateral side with some large but shallow punctures, shiny; metascutellum impunctate; upper half of mesepisternum with some very large and clearly separated punctures, surface smooth (Fig. 5), other part of mesopleuron and metapleuron smooth, impunctate; abdominal tergites smooth, impunctate, strongly shiny.

Labrum large and flat, basal furrow exposed; clypeus roundly incised to a depth about 0.6 times length of clypeus, lateral lobe short, apex narrowly round (Fig. 4); malar space 0.3 times as long as diameter of lateral ocellus; inner margins of eyes feebly convergent downwards, distance between eyes at level of basal corner of clypeus 1.2 times as long as longest axis of an eye; middle fovea round, deep, much larger than lateral foveae; inner orbit obtusely angulated

just above lateral foveae; lateral frontal walls distinct, strongly divergent forwards; interocellar furrow broad, distinct; postocellar furrow fine and shallow; postocellar area weakly elevated, 1.15 times as long as broad, lateral furrows deep and almost straight, hardly divergent backwards; POL: OOL: OCL = 12: 17: 30; head distinctly dilated behind eyes, temple as long as eye in dorsal view (Fig. 3); occipital carina absent in lower 0.35, very low and obtuse but recognizable in upper 0.65; left mandible as Fig. 7, basal tooth short, obtuse at apex, incision between basal two teeth triangular with sharp bottom, inner sides of basal two teeth strongly divergent toward apex. Antenna as long as head, thorax and abdominal tergite 1 together, pedicellum longer than broad, antennomere 3 about 1.35 times as long as antennomere 4, antennomere 8 about 2.2 times as long as broad (Fig. 8). Mesoscutellum weakly elevated with one obtuse peak, anterior slope weakly oblique, posterior slope 1.25 times as long and almost perpendicular to mesoscutellar appendage (Fig. 6); cenchrus not very small, narrow, oblique, $CD = 3.8$; metascutellum broad and flat (Fig. 6). Venation. Vein R very short, about 0.5 times as long as vein R+M, R+M about 0.8 times as long as 1r-m, crossvein cu-a meeting cell 1M at middle, crossvein 2r meeting cell 2Rs at apical 0.25, cell 2Rs slightly longer than 1R1 and 1Rs together; petiole of anal cell in hind wing about 0.5 times as long as cu-a. Metabasitarsus 0.82 times as long as tarsomeres 2–5 together; claw with a small and obtuse basal lobe, inner tooth clearly longer than apical tooth (Fig. 9). First abdominal tergum with a cluster of hairs at middle; cercus short, about 2 times as long as broad; ovipositor sheath 0.8 times as long as hind tibia, apical sheath as long as basal sheath (Fig. 10). Lance slender, with distinct dorsal teeth from basal 0.4 to apex, annular spines absent. Lancet distinctly narrowed at base (Fig. 11), annular spines band very broad, serrulae flat with many minute subbasal teeth, serrulae 7–8 (counting from base) as Fig. 12, with 23–24 fine distal teeth, without proximal tooth.



Figures 1, 2. 1. *Conaspidia wangi* Wei sp. nov.; 2. *C. qinlingia* Wei sp. nov. Adult female.

Male. Unknown.

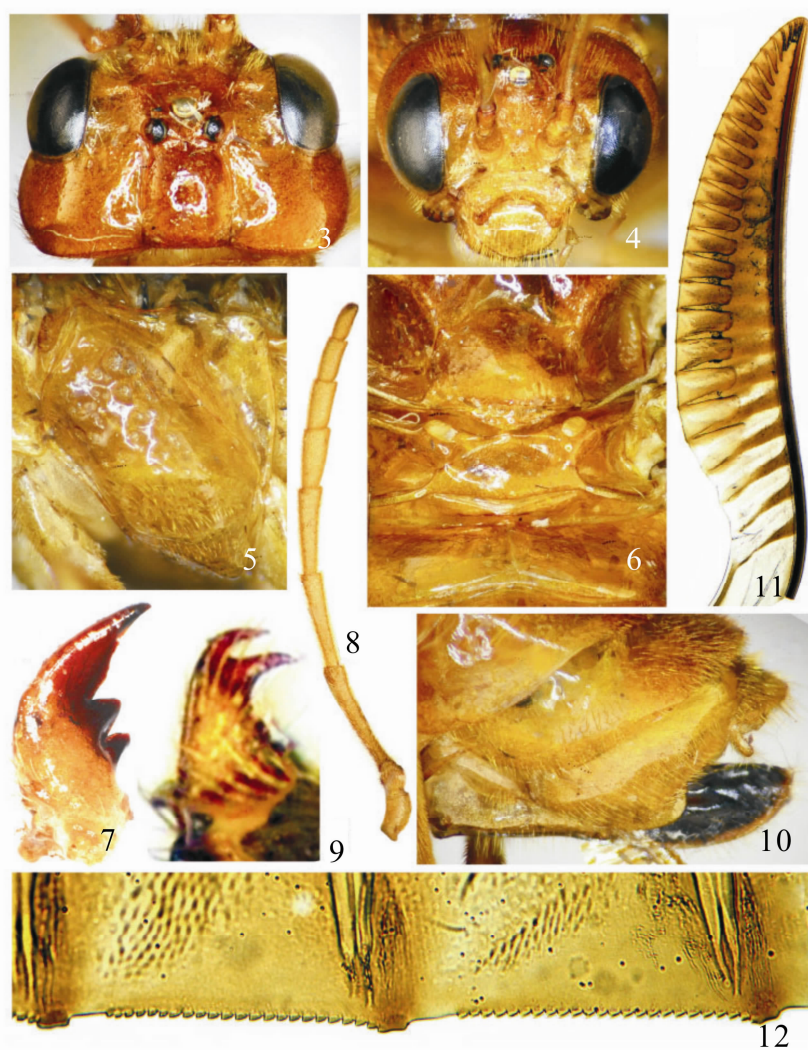
Distribution. China (Zhejiang).

Etymology. This species is named after the surname of the collector of the holotype.

Holotype. ♀, **China**, Zhejiang, Taishun, Mt. Wuyanling, alt. 1000 m, 28-VII-2005, coll. Yiping WANG (CSCS).

Host plant. Unknown.

Remarks. This new species belongs to the *C. bicuspis* group (Wei & Nie 1997) but it is remote from known species of this group. This species is distinct from its congeners by the occipital carina absent in lower 0.35 and very weak in upper 0.65, the female lancet distinctly narrowed at base and the serrulae flat with many fine teeth, as well as the abdomen yellow brown and tergite 5 with a medially separated black stripe.



Figures 3–12. *Conaspidia wangi* Wei sp. nov. 3. Head, dorsal view; 4. Head, frontal view; 5. Mesepisternum, left side; 6. Mesoscutellum, cenchri and metascutellum, dorsal view; 7. Left mandible; 8. Antenna; 9. Claw; 10. Ovipositor sheath, lateral view; 11. Lancet; 12. Serrulae 7–8 of female lancet.

2. *Conaspidia qinlingia* Wei sp. nov. (Figs. 2, 13–26)

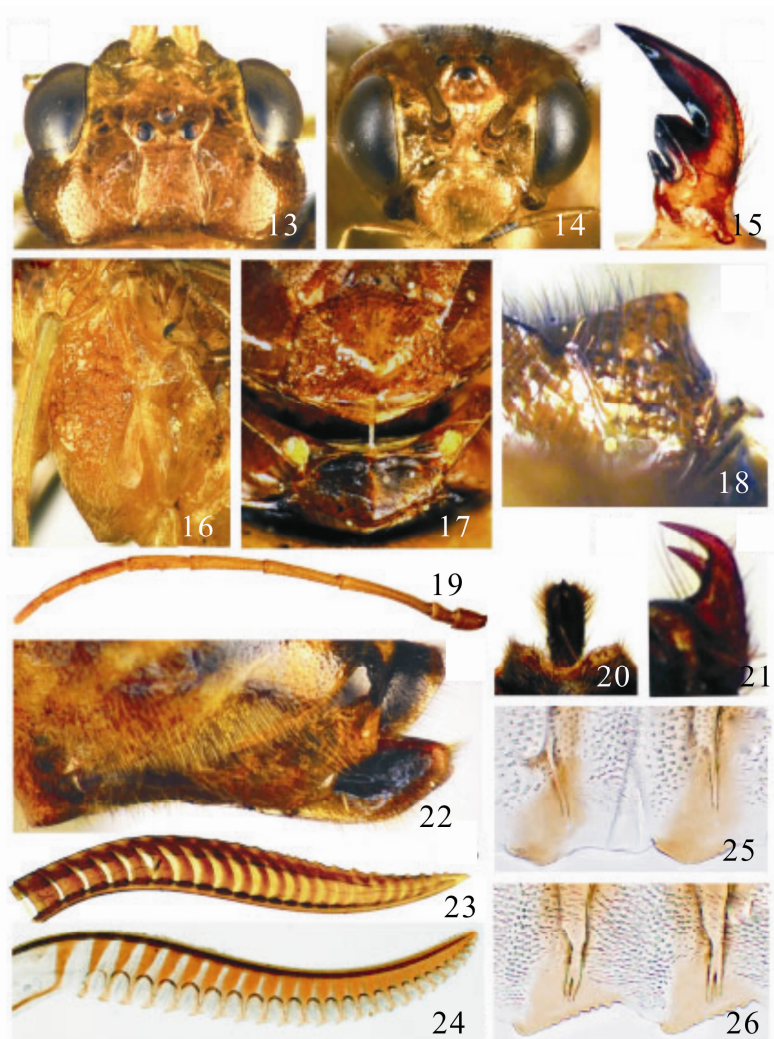
urn:lsid:zoobank.org:act:CD4B5EB1-8AE6-4CA7-990B-5622EB06FF4F

Female. Body length 12 mm (excluding antenna and sheath, Fig. 2). Dorsum of body dark yellow brown, ventral side pale yellow brown, metapostnotum largely, narrow anterior margin of abdominal tergite 2 and narrow posterior margin of tergite 2, broad posterior margin of tergites 3–8, middle of tergite 9 and tergite 10 entirely black, tip of mandibles dark reddish, antenna yellow brown, scape, pedicellum and apex of flagellum slightly darkened; legs pale yellow brown; body hairs yellow brown, setae on sheath and spines on wing membrane brown. Wings hyaline, distinctly yellow toward base, wing macula as in Fig. 2, apical spot deep colored, posterior half of vein Sc+R, veins Rs, M and Cu largely dark brown to blackish brown, pterostigma black brown in basal 3/4 and yellow brown in apical 1/4.

Labrum with a few shallow and indistinct punctures; clypeus with some shallow punctures; supraclypeal area, inner orbit and frontal area impunctate, feebly coriaceous, strongly shiny; temple, postocellar area and upper part of postorbit with small and shallow punctures, interspaces smooth and much broader than diameter of punctures. Anterior of pronotum smooth, depressed part of pronotum with some shallow and indistinct punctures, broad posterior margin densely but shallowly punctured; punctures on mesoscutal middle lobe and lateral lobes shallow, small and dense; anterior slope of mesoscutellum with some large and shallow punctures, surface smooth, lateral side reticulate, punctures large and dense, still shiny, posterior slope with some large and sparse punctures; metascutellum impunctate; upper half of mesepisternum reticulate, punctures very large, interspaces linear, sharp (Fig. 16), ventral half shallowly and sparsely punctured, other part of mesopleuron and metapleuron smooth, impunctate; abdominal tergites 1–2 smooth, impunctate, other tergites with distinct but shallow punctures, shiny.

Labrum large and flat, basal furrow exposed; clypeus deeply and broadly incised to a depth about 0.7 times length of clypeus, lateral lobe narrow and long, apex narrowly round (Fig. 14); left mandible with a long and straight basal tooth, incision between basal two teeth very deep and narrow, inner sides of basal two teeth parallel in basal 0.65 (Fig. 15); malar space 0.25 times as long as diameter of lateral ocellus; inner margins of eyes straight, almost parallel, distance between eyes at level of basal corner of clypeus 1.05 times as long as longest axis of an eye; middle fovea round, shallow, small, hardly larger than lateral foveae; inner orbit not distinctly angulated above lateral foveae; lateral frontal walls distinct, strongly divergent forwards, frontal basin with a shallow middle furrow; interocellar furrow narrow, distinct; postocellar furrow fine and shallow; postocellar area weakly elevated, 1.2 times as long as broad, lateral furrows deep and slightly bent, weakly divergent backwards; POL: OOL: OCL = 11: 20: 30; head weakly dilated behind eyes (Fig. 13), temple as long as eye in dorsal view; occipital carina sharp and complete. Antenna slender, as long as head, thorax and abdominal tergites 1–2 together, pedicellum much longer than broad, antennomere 3 about 1.25 times as long as antennomere 4, antennomere 8 about 3.5 times as long as broad (Fig. 19). Mesoscutellum distinctly elevated with one peak, anterior slope oblique, posterior slope 2 times as long as and almost perpendicular to mesoscutellar appendage (Fig. 18); cenchrus small, roundish, CD = 4.2; metascutellum broad and flat (Fig. 17). Venation (Fig. 2). Vein R very short, about 0.3 times as long as vein R+M, vein R+M about as long as 1r-m, cu-a meeting cell 1M at about middle, 2r meeting cell 2Rs at apical 0.35, cell 2Rs slightly longer

than 1R1 and 1Rs together; petiole of anal cell in hind wing 0.5 times as long as cu-a. Metabasitarsus 0.85 times as long as tarsomeres 2–5 together; claw with a small and obtuse basal lobe, inner tooth clearly shorter than apical tooth (Fig. 21). First abdominal tergum with several hairs at middle; cercus short, about 1.7 times as long as broad; sheath in dorsal view as in Fig. 20, lateral setae distinctly curved; ovipositor sheath 1.15 times as long as hind tibia, apical sheath as long as basal sheath (Fig. 22). Lance slender, evenly tapering toward apex, with obtuse dorsal teeth, without annular spines (Fig. 23). Lancet slender, not distinctly narrowed at base (Fig. 24), annular spines band broad, middle serrulae oblique, with 6–8 small distal subbasal teeth, serrulae 1–2 and 7–8 (counting from base) as Figs. 25, 26.



Figures 13–26. *Conaspidia qinlingia* Wei sp. nov. 13. Head, dorsal view; 14. Head, frontal view; 15. Left mandible; 16. Mesepisternum, left side; 17. Mesoscutellum, cenchri and metascutellum, dorsal view; 18. Mesoscutellum and appendage, lateral view; 19. Antenna; 20. Ovipositor sheath, dorsal view; 21. Claw; 22. Ovipositor sheath, lateral view; 23. Lance; 24. Lancet; 25. Serrulae 1–2 of female lancet; 26. Serrulae 7–8 of female lancet.

Male. Unknown.

Distribution. China (Shaanxi).

Etymology. The specific epithet of the new species is derived from Mt. Qinling, while Mt. Taibaishan is the highest peak of the mountain.

Holotype. ♀, **China**, Shaanxi, (Mt. Taibaishan), Foping, Liangfengya, 107°51.250'E, 33°41.117'N, alt. 2128 m, 18-VI-2014, coll. Liwei QI (CSCS).

Host plant. Unknown. The holotype was collected near a tree of *Kalopanax septemlobus*.

Remarks. This species is close to *C. bicuspis* Malaise, 1945 but differs from the latter in the following: the basal two teeth of left mandible very narrowly separated; CD = 4.2; abdomen yellow brown, tergites 2–9 with entire black stripes; the middle serrulae of female lancet weakly oblique with 8–10 distal subbasal teeth, not strongly protruding; mesoscutellum with 1 peak; the hind femur entirely yellow brown; pterostigma black at basal 0.75 and yellow brown at apical 0.25, the black stripe under pterostigma distinctly separated at middle, and cell Sc largely black. In *C. bicuspis*, the basal two teeth of left mandible broadly separated; CD = 6–7; abdomen yellow brown, tergites 6–8 with medially separated black stripes; the middle serrulae of female lancet strongly and narrowly protruding with 3–4 distal subbasal teeth; mesoscutellum with 2 peaks; the hind femur with a black ring at apex; pterostigma black at basal half and yellow brown at apical half, the black stripe under pterostigma not separated at middle, and cell Sc entirely yellow brown.

3. *Conaspidia guttata* (Matsumura, 1912) (Figs. 27–38)

Eriocampa guttata Matsumura, 1912: 63

Conaspidia trifasciata Malaise, 1931: 204

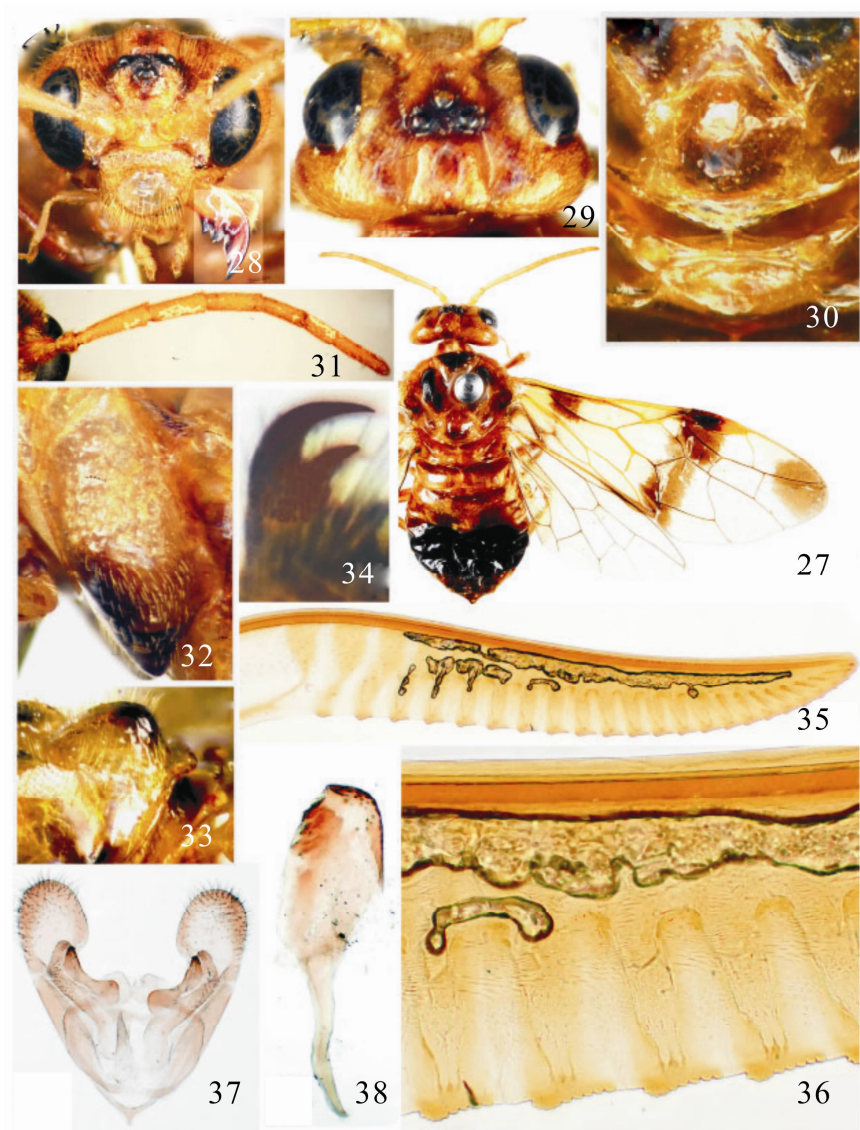
Conaspidia murotai Togashi, 1984: 580, **syn. nov.**

Conaspidia ishikawai Togashi, 2005: 846, **syn. nov.**

Female. Body length about 10–12 mm, mainly yellow brown, thorax and abdomen more or less black; legs yellow brown, hind femur sometimes partly black; body hairs yellow brown; forewing with a distinct basal black stripe, a broad middle black stripe under pterostigma and a roundish apical black spot; pterostigma black at about basal 0.6 and yellow brown at about apical 0.4 (Fig. 27).

Body robust; labrum large with basal furrow exposed; clypeus moderately emarginated with lateral lobe about 2 times as long as middle length of clypeus; left mandible with basal two teeth small and obtuse, closed to each other, middle incision between basal two teeth shallow and triangular, both sides strongly divergent toward apex (Fig. 28); malar space linear; distance between eyes longer than longest axis of an eye; occipital carina distinct and complete, not very sharp; postocellar area about as long as broad, lateral furrows deep, almost straight, subparallel; head weakly dilated behind eyes in dorsal view (Fig. 29); antenna stout, filiform, antennomere 3 clearly longer than antennomere 4 (Fig. 31); temple with some shallow and small punctures, postorbit smooth with scattered and minute punctures except for a row of larger puncture along occipital carina. Mesoscutellum distinctly elevated with one roundish peak, posterior slope perpendicular to mesoscutellar appendage (Figs. 30, 33), anterior slope with some shallow and large punctures, posterior slope with dense punctures; cenchrus small, CD = 3.5–4; upper half of mesepisternum reticulate, interspaces mostly linear but not sharp (Fig. 32). Forewing. Vein cu-a meeting cell 1M at about middle, vein R+M longer than vein R;

petiole of hind anal cell about half length of vein cu-a (Fig. 27). Metabasisarsus about as long as tarsomeres 2–5 together; claw without basal lobe, inner tooth clearly shorter than apical tooth (Fig. 34). Abdominal tergites smooth, without distinct punctures or microsculpture. Lance slender, without annular spine; lancet slender (Fig. 35), middle serrulae oblique, weakly protruding, with about 5–6 distinct distal subbasal teeth (Fig. 36).



Figures 27–38. *Conaspidia guttata*, non-type, Shintoku. 27. Female adult; 28. Head and left mandible, frontal view; 29. Head, dorsal view; 30. Mesoscutellum, cenchri and metascutellum, dorsal view; 31. Antenna; 32. Mesepisternum, left side; 33. Mesoscutellum and appendage, lateral view; 34. Claw; 35. Lancet; 36. Serrulae 7–10 of female lancet; 37. Gonoforceps; 38. Penis valve.

Male. Body length about 9–10 mm; color and structure similar to female except for genitalia. Gonoforceps as Fig. 37, harpe roundish; penis valve as Fig. 38, apical margin of valviceps roundly truncate, distinctly upturned.

Variation. The color of thorax and abdomen of this species varies a great deal. The color of the holotype of *C. ishikawai* and of *C. murotai* is within the color spectrum of *C. guttata*. (See the comment under remarks below).

Distribution. Japan; Korea; Russia (Far East).

Type material examined.

1♀, holotype of *C. guttata*: 18/VII, 90', Moiwa; *Eriocampa guttata* Mats., Type; *Conaspidia guttata* (Matsumura, 1912), det. M. Wei, 2014. (SEHU, in good condition).

1♀, holotype of *C. trifasciata*: Japan, Malaise; Hakodate, *Conaspidia trifasciata* n. sp., Malaise; Typus [red]; *Conaspidia guttata* Malaise, det. M. Wei, 2010; 4f#2m#, Japan, Malaise; Hakodate, 07-VI-1920; paratypus [red] (SNHM, all in good condition).

1♀, holotype of *C. murotai*: (JAPAN: FUKUI PR.) Hachibuse-yama, Imajo, 01-IX-1981, T. Murota leg.; Typus [red]; *Conaspidia murotai* Togashi, sp. nov., det. Togashi, 1984. (ELKU, in good condition).

1♀, holotype of *C. ishikawai*: Holotype: female, Mt. Hakusan (altitude: 1300–1500 m), Ishikawa Prefecture, Honshu, Japan, 17-VI-2004, T. Togashi leg. (NSMT, in good condition).

1♀, paratype of *C. ishikawai*: Same data as the holotype except 15-VI-2004, T. Ishikawa leg. (NSMT).

1♀, paratype of *C. ishikawai*: 1300–1500 m, ...[word not clear]; Paratype, *Conaspidia ishikawai*, sp. nov.; *Conaspidia guttata* (Mats.), det. M. Wei, 2012. USNM.

Other specimens examined. 2♀2♂, [Japan] Hokkaido, Tokachi, Shintoku, 10–20-V-1998, H. Hara, em. from cocoon in soil under *Kalopanax pictus*, 19-IX-1997; *Conaspidia guttata* ?= *murotai*, Det. A. Shinohara, 2011. (CSCS). 6♀1♂, Japan, Hokkaido, *Conaspidia guttata* Matsumura, det. C. Watanabe, 1949 (SEHU). 1♀, Kawayu, Hokkaido, 22-VII-1966, M. Suwa (SEHU). 1♀, coll. H. Kumamoto; *Conaspidia guttata* Matsumura, det. H. Kumamoto; Kuriyadani (Kita-Alps), 03-VI-1978 (SDEI). 1♀1♂, Japan, Malaise; Hokaidate, 07-VI-1920 (USNM). 1♀, Japan, Honshu, Nagano; Tobira-kousen, 07-VI-1968, T. Naito (KUK). 1♀1♂, Marunuma, Okunikko; 24-VII-1966, K. Tsuji (KUK). 1♀, Ashiwadayama, by Kawaguchiko, Yamanashi Pref., 01-VI-1956, R. Ishi[Ishikawa?] (KUK). 1♀, Nagano, Shimajima-dani, 04-VII-1966, H. Shima (KUK). 1♀, Korea, Cheonwangbang, 15-VII-1984, M. S. Kwak leg. (YNU). 1♀1♂, [Kyushu] Mt. Kurodake, Oita Pref., 20-V-1986, M. Abe leg. (USNM).

Host plant. *Kalopanax pictus* (Thunb.) Nakai (Hara and Togashi 1998).

Remarks. *C. guttata* is close to *C. scutellaris* Malaise, 1945 and *C. kalopanacis* Xiao & Huang, 1983 from central and south China. *C. guttata* differs from the latter two species by the following: the dorsum of head and thorax distinctly punctured, mesoscutellum punctured at least laterally; the upper half of mesopleuron reticulate, interspaces between punctures very narrow; the under thorax partly black, mesonotum with 5 black spots or mostly black; CD smaller than 4. In *C. scutellaris* and *C. kalopanacis*, the dorsum of head and thorax impunctate, mesoscutellum entirely smooth; the punctures on upper half of mesopleuron quite sparse, interspaces broad, flat, shiny; the under thorax entirely yellow, mesonotum entirely yellow brown or with two small black spots; CD larger than 4.

Conaspidia ishikawai, holotype, a dark pattern of *C. guttata*: mesonotum and mesepisternum largely black, the lateral margins of mesoscutal middle lobe and the center of lateral lobe, the upper margin of parapsis, a stripe on mesopleural suture pale brown, the basal half of tergite 1 and tergites 4–6 largely black; mesoscutellum strongly elevated, about 2 times as high as length of mesoscutellar appendage.

Conaspidia murotai, holotype, a pale pattern of *C. guttata*: the thorax and abdomen yellow brown, mesonotum with three black spots, the ventral half of mesepisternum black, tergites 4–6 largely black; mesoscutellum not so strongly elevated, about 1.5 times as high as length of mesoscutellar appendage.

The difference of punctuation between *C. murotai* and *C. guttata* figured by Togashi (1984), *C. ishikawai* and *C. murotai* figured and stated by Togashi (2005) is not true. Holotypes of *Eriocampa guttata* Matsumura, *Conaspidia ishikawai* Togashi and *Conaspidia murotai* Togashi have been examined and compared. No distinct difference has been found except for body color.

The three Japanese species of *Conaspidia* can be separated by using the following key.

Key to Japanese species of *Conaspidia*

1. Forewing with three smoky bands, pterostigma black at about basal 0.65 and yellow brown at about apical 0.35; basal tooth of left mandible short and obtuse, not broadly separated from middle tooth at base; length of lateral lobe of clypeus about 2 times as long as middle length of clypeus; mesoscutellum distinctly elevated, posterior slope perpendicular to and distinctly higher than middle length of mesoscutellar appendage; CD = 3.5–4; crossvein cu-a of forewing meeting cell 1M at or beyond middle..... *C. guttata* (Matsumura)
- Forewing hyaline or feebly infusate, without smoky band, pterostigma black entirely or about basal 0.35 yellow brown; basal tooth of left mandible long and acute, broadly separated from middle tooth at base; length of lateral lobe of clypeus about 4 times as long as middle length of clypeus; mesoscutellum almost flat or weakly elevated, if posterior slope steep, then its height much shorter than middle length of mesoscutellar appendage; CD = 2; crossvein cu-a of forewing meeting cell 1M at about basal 0.35..... 2
2. Pterostigma black brown to black entirely; wings evenly grayish without yellow tinge; mesoscutellum with an elevated posterior corner, anterior margin weakly and roundly protruding; forewing with vein R+M clearly shorter than vein R, petiole of hind anal cell about as long as cu-a; head and abdomen usually black, mouthparts, mesoscutellum and basal three abdominal segments more or less yellow brown *C. singularis* (Malaise)
- Pterostigma black brown in apical 0.65 and yellow brown in basal 0.35; wings hyaline with yellow tinge; mesoscutellum flat, without elevated posterior corner, anterior margin subtriangularly protruding; forewing with vein R+M clearly longer than vein R, petiole of hind anal cell about half length of cu-a or less; head and abdomen usually largely yellow brown with small black macula or weakly infusate area *C. hyalina* Sato

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References

- Forsius R. 1931. Über einige neue oder wenig bekannte orientalische Tenthredinoiden (Hymenopt.). *Annalen des Naturhistorischen Museums in Wien*, 46[1932–1933]: 29–48.
- Hara H & Togashi I. 1998. The larva and cocoon of *Conaspidia murotai* (Hymenoptera, Tenthredinidae), with notes on its biology. *Japanese Journal of Systematic Entomology*, 4(1): 25–29.
- Haris A & Roller L. 1999. Four new sawfly species from Yunan (Hymenoptera: Tenthredinidae). *Folia Entomologica Hungarica*, 60: 231–237.
- International Commission on Zoological Nomenclature (ICZN). 2008. Proposed amendment of the International Code of Zoological Nomenclature to expand and refine methods of publication. *Zootaxa*, 1908: 57–67.
- Malaise R. 1931. Neue japanische Blattwespen. *Zoologischer Anzeiger*, 94(5-8): 201–213.
- Matsumura S. 1912. *Thousand Insects of Japan. Supplement 4*. Keiseisha, Tokyo, 247 pp.
- Shinohara A. 2003. The sawfly genus *Conaspidia* (Hymenoptera, Tenthredinidae) in Vietnam. *Special Bulletin of the Japanese Society of Coleopterology*, (6): 415–422.
- Smith DR & Saini MS. 2003. A new species of *Conaspidia* Konow (Hymenoptera: Tenthredinidae) from India and review of the Indian species. *Proceedings of the Entomological Society of Washington*, 105(3): 555–558.
- Takeuchi K. 1952. *A Generic Classification of the Japanese Tenthredinidae (Hymenoptera: Symphyta)*. Kyoto, 90 pp.
- Togashi I. 1984. The sawfly genus *Conaspidia* Konow in Japan (Hymenoptera: Tenthredinidae). *Kontyû*, 52(4): 580–584.
- Togashi I. 2005. A new species of the genus *Conaspidia* Konow (Hymenoptera: Tenthredinidae) from Japan, with a key to the Japanese species. *Proceedings of the Entomological Society of Washington*, 105(3): 846–850.
- Wei MC. 2000. Notes on some Forsius' types of Asian sawflies (Hymenoptera: Tenthredinoidea) with description of a new species. *Entomologia Sinica*, 7(4): 299–307.
- Wei MC & Nie HY. 1997. Studies on the genus *Conaspidia* Konow (Hymenoptera: Tenthredinidae) from China with a key to known species of the world. *Journal of Central South Forestry University*, 19 (supplement): 95–117.
- Wei MC & Nie HY. 1998. Generic list of Tenthredinoidea in new systematic arrangement with synonyms and distribution data. *Journal of Central South Forestry University*, 18(3): 23–31.
- Xiao GR, Zhou SZ & Huang XY. 1983. Two new species of Tenthredinidae from China. *Scientia Silvae Sinicae*, 19: 46–49.